

**To:** Enck, Judith[Enck.Judith@epa.gov]; David Engel[Dengel@nolanandheller.Com]  
**Cc:** Hickey, Michael R.[Michael.Hickey@acadia-ins.com]  
**From:** Lyons, Brendan  
**Sent:** Fri 12/18/2015 5:32:19 PM  
**Subject:** FW: more about PFOA in Hoosick water

**From:** d hassel <dhasse@nycap.rr.com>

**Date:** Thursday, December 17, 2015 at 2:04 PM  
**To:** Brendan Lyons <blyons@timesunion.com>  
**Subject:** RE: more about PFOA in Hoosick water

Hello again,

In thinking about my work in Hoosick Falls, where I did some engineering tasks on almost every plant and process, I had a few more thoughts as to where to look for contamination, where it originated, and how the processes would release it into water or air. I was not the Chemical engineer at McCaffrey St. ( I think Dick Hauser was) , so I didn't and don't have any info as to what was the exact composition of the raw materials used back in the late 70's and early 80's when I worked there, but I did work extensively on the processing equipment. I do know that one major supplier was ICI, another was probably Dupont.

One consumer product which sometimes shows PFOA levels of up to 3490 ppb (In a 2009 USEPA study of 116 products) is PTFE plumbing sealant tape, which was made in quantity in the Liberty St. plant. The basic raw material for that product was Teflon powder in oil, presumably with PFOA added sometimes to keep it smooth. ( some tape tested at less than 1.5 ppb, so the PFOA was apparently not a necessary ingredient, but an optional one) ) It makes sense that the final product would have a high percentage of PFOA left if it was in the original raw material, since the tape was extruded and then dried at moderate temperatures. This was unlike all the other products made of PTFE in Hoosick falls which were subject to high temperatures ( typically 330-340 deg C )at some point in their processing to make sure the powder fully bonded into solid PTFE. If there was some PFOA in the mix, it would have been split between going into the air around the plant and going out with the product. If it wasn't in the raw material, it probably was not present at the plant.

There is such a thing as solid PTFE tape, which is hard and does not stretch easy, quite different from plumbing tape which is soft and pliable . When heated, PTFE, unlike most other plastics, does not melt into a high viscosity liquid. It turn into a semi-solid gel and decomposes if kept at temperature in air for very long. To make the hard solid PTFE tape, PTFE powder was placed into a large diameter long cylinder which was heated to high temperature. ( there were many sizes of these extruders in the McCaffrey St. plant.) As the powder was pushed from the cool entrance to the high temperature region of the pipe, its own expansion produced high pressure, which combined with the high temperature and lack of air, allowed the powder to fuse into a solid without decomposing. The small extruders made Teflon rods, which were sold as is or were turned into parts at the River St plant. From the largest extruder the resulting 12 to16 inch diameter Teflon solid was cut into 2-3 ft lengths and put on a skiving lathe similar to a wood veneer lathe and cut into film, which could be sold as is or coated with adhesive at John St. and sold as Teflon tape. Since nothing sticks to pure Teflon, the tape had to be etched with a sodium solution before the adhesive coating process. I worked on the heaters for the large extruder and helped buy the oven to dry the adhesive and helped build the etcher at John St. The main source of PFOA from this process would be fumes from the high temperature treatment of the PTFE. Pollution would probably be fairly small from the extruders, since the high temperature part of the process was shielded from air. Other products were made by pressing powder into blocks, heating them in an oven to fuse, and then machining them. A popular use was holders for semiconductor wafers, which were only about 6" in diameter back then. These oven products would produce airborne PFOA in quantity, as detailed below.

Another operation was the pressing of PTFE coated fabric into printed circuit boards at the Liberty St Plant. Presumably the PFOA was mostly gone by the time the fabric got there, but the heating method of the press (unknown at the time to be a problem) was a very dangerous and toxic method. 100% PCB oil was used to heat the press by heating it and circulating it through the platens. I remember that the heating system leaked and sprayed the oil into the air in the vicinity of the press. I was wary of it at the time because I didn't like the smell....even though the manufacturer assured us it was inert and non-toxic.

The significance of all these high temperature processes involving PTFE powder is that even if PFOA wasn't used in the raw material powders or solutions, the high temperatures always decompose a fraction of the PTFE, (from less than .1% at 400 deg C to about 1% per hour at 450 deg C) and the byproducts are PFOA and other similar toxic fluorocarbon compounds.\*\* This would be especially true for the fabric ovens which use high temperature infrared panels to fuse the PTFE onto the glass fabric in the upper section, and produced toxic fumes. I once got a whiff of the fumes when testing a new oven and was sick for two days( headache, nausea, muscle aches, really horrible pain, but it all vanished after about 48 hours.) I researched the poisoning at the time and found a study done on some service members who were made similarly sick by fumes from plumbing tape used on the exhaust of a gasoline powered generator used on a military airplane. They did a several year follow up and said there were no lasting effects on the lungs of the servicemen....I wonder if they followed up for another 10-20 years and looked for cancers? Probably not. The sickness had the same symptoms as affected welders who welded galvanized metal and inhaled the zinc fumes. They called it "metal fume fever" back then. These days in Europe it's called "Polymer Fume fever" and describe it the same way. There was no treatment except to wait until it passed, as there seemed to be no obvious lasting effects.

Yet another issue to bring up is that McCaffrey St was not the only one in the area making Teflon coated fabric in large infrared ovens. Chem Fab over in Bennington made much wider fabric in bigger ovens. Taconic Plastics in Petersburg is another. Quite a few of the managers and engineers have worked at more than one of these companies and all their equipment and technology is very similar. Michael please note: At a minimum, well water near these other plants needs to be tested.

**\*\*The following suggests that not only PFOA is involved here, and the correlation of cancer and chemicals may need to be broadened to include the other decomposition products of PTFE:**

**1) "The environmental significance of these findings is confirmed by modelling, which indicates that the thermolysis of fluoropolymers in industrial and consumer high-temperature applications (ovens, non-stick cooking utensils and combustion engines) is likely to be a significant source of trifluoroacetate in urban rain water (~ 25 ng l<sup>-1</sup>, as estimated for Toronto). Thermolysis also leads to longer chain polyfluoro- and/or polychlorofluoro- (C3–C14)**

**carboxylic acids which may be equally persistent. " Source:Letters to Nature *Nature* 412, 321-324 (19 July 2001) | doi:10.1038/35085548; Received 15 November 2000; Accepted 22 May 2001 Thermolysis of fluoropolymers as a potential source of halogenated organic acids in the environment David A. Ellis<sup>1</sup>, Scott A. Mabury<sup>1</sup>, Jonathan W. Martin<sup>2</sup> & Derek C. G. Muir**

2) Some of the main Decomposition products of PTFE at temperatures up to 450 deg C:” Carbonyl fluoride, HFP (hexafluoropropylene, PFIB (perfluoroisobutylene), TFE (tetrafluoroethylene). Source: **AGC Chemicals Europe, Ltd.** **Online copy of:** Guide for the Safe Handling of Fluoropolymer Resins January 2012 by PlasticsEurope

-----  
**From:** d hassel <[dhassel@nycap.rr.com](mailto:dhassel@nycap.rr.com)>  
**Date:** Tuesday, December 15, 2015 at 12:38 PM  
**To:** Microsoft Office User <[blyons@timesunion.com](mailto:blyons@timesunion.com)>  
**Subject:** PFOA in Hoosick water

HI

Your story about Hoosick falls water was very informative. I have quite a few connections with it and some more information for you if you write again. I would ask that in any case you pass it along to Michael Hickey (I'm not on Facebook, where his group is) , as it might lead to more groundwater testing in Hoosick falls. I worked at the McCaffrey St. plant as a mechanical engineer from about 1976 to 1985. I designed some of the large 2 story ovens that used pfoa in coating glass fabric, the main product of that plant. At the time, I thought that there was only Teflon (PTFE) powder and Triton surfactant in the coating solution, but it makes sense that there would be PFOA as well. My years working right in the middle of the highest concentrations of PFOA explain why I got prostate cancer in my 50's, a very young age for that disease. After reading your article I did some more research on my own and saw pretty strong evidence that that was the cause. I thought I should contact some of my former co-workers and warn them, but the first two I thought of were both dead of cancer at fairly young ages.....

The main reason I bring this up is that I also designed and built similar ovens for the plant on John St., which coated fiberglass thread and aluminum foil with the same solution . There was a stream running thru the bottom of the building, which had been some sort of mill ,before Oak Materials bought it. As far as I know the building no longer exists ( It was falling apart in 1984), but there was a lot of PFOA handled there and it's probably in the groundwater there too at pretty high levels.

As an engineer, I'm puzzled as to how the waste water got into the ground at McCaffrey St. I didn't have anything to do with sewers, septs or other waste disposal equipment at that time. I do recall that the management at the time was not what you would call responsible when it came to things like that. The head of the McCaffrey St plant made a famous quote when asked about the smelly exhaust from the Teflon ovens and said " It smells like money to me"(He lived and drank the water in Bennington). After I moved to the R&D division ( I'm pretty sure Kevin Allard worked for me there) and out of manufacturing engineering they did put scrubbers on the oven exhaust. If Judy wants to know how long the groundwater has been heavily contaminated, I'd bet it would have

started somewhere about 1980-83, when they installed the scrubbers. Before that the main source of water pollution was probably washing out the dip tanks for the cloth and general cleaning of the ovens and coating equipment. As all engineers know, using scrubbers just turns air pollution into water pollution, and the big question in my mind is where did the heavily contaminated water from the scrubbers go? Into the village sewer system? Into a septic system? Directly into the river a few yards away? It would be helpful to anyone trying to fix the current situation to know where that went, as it was probably the most contaminated waste water. As I understand it, the PFOA helped to stabilize the Teflon particle mixture being spread on the cloth and then was evaporated away (along with the Triton and the water) by the ovens, leaving behind just pure PTFE on the glass cloth or thread. The scrubbers should have caught the PFOA and re-condensed it, but where did it go from there is the main question. The EPA should know from their actions with DuPont if and when the PFOA was removed from the coating solution, and that should bracket the time when the main deposit was made (1982-2006?).

Thanks again for your very good article and please keep following the story. I tried to find out how to contact Judith Enck ( an old friend of my deceased first wife) and send this info to her as well, and I did find a phone number, but not an E-mail address. If you have a way please send it to her as well as to Michael. Thanks

David Hassel 46 Edwards Rd. Wynantskill NY 518-283-0247.